IPT WORKSHOP BRIEFING TEMPLATE

The NOAA IOOS Program shares the goal of improved data accessibility with many other programs. These goals universally understand that high-quality metadata are a critical part of any significant step towards that goal. Understanding where we are is an important initial step in the metadata improvement process. This document provides a snapshot of metadata from three IOOS Data Providers and is a first step towards the goal of high-quality, standards-compliant metadata for all NOAA data.

The Metadata Standards Spectrum described in detail in Appendix 1 provides a simplified picture of a path towards that goal with metadata standards or states as signposts along that path. Figure 2 shows where the metadata we examined presently is along that path and the discussion above describes why. We also identified several specific recommendations for each data provider (listed below).

The metadata sections of the NDBC Interoperability Plans suggested a set of steps required to migrate their metadata and systems towards standards compliance:
Acquire metadata expertise, Compile and publish vocabulary, Design a data management system to validate FGDC, Software development, Achieve FGDC Compliance, Register metadata
NDBC suggested that 3-4 FTE's would be required for two years to accomplish these steps. A similar migration path was proposed by CO-OPS for their non-FGDC datasets. They estimated that, depending on IOOS DIF WSDE workload, this effort may be pushed off to late FY2009 or early FY2010.

The NGDC experience with IOOS Data Providers and many others suggests that these steps should be taken as part of a larger metadata training and management program that builds partnerships that take advantage of existing metadata expertise and examples. The Metadata Team at NGDC has a good track record of working with NOAA data providers to create and maintain high-quality metadata. The DART metadata created along with NGDC is a good example of the positive results of such a partnership.

Specifically, in terms of the steps listed above, NGDC already has metadata expertise, and a well developed system for managing metadata that 1) can validate metadata against FGDC and ISO standards, 2) takes advantage of several controlled vocabularies, 3) provides metadata in several popular standards (FGDC, DIF and soon in ISO), and 4) registers those metadata with Geospatial One-Stop, the NASA Global Change Master Directory (GCMD), and FirstGov. Currently this system, the NOAA Metadata Manager and Repository, manages nearly 20,000 metadata records from NOS, NESDIS, NGDC, and NCDC using FGDC Remote Sensing Extensions and ISO OnLine Resources. We are currently evaluating an open source replacement for the NMMR that adds support for the ISO 19115 and 19115-2 standards (GeoNetwork).

Given this experience and these existing resources, we suggest that 3-4 FTE's at NGDC could satisfy these requirements for all NOAA IOOS Data Providers and products presently included in the IOOS DIF. In addition, we could migrate those metadata to the endpoint of the Metadata Standards Spectrum: high-quality ISO metadata with important extensions and service metadata. This approach would also provide a strong foundation for partnerships to extend this work to the broader NOAA community. In fact, the NGDC Metadata Team is already working on metadata for NPP/NPOES and GOES-R.

This ambitious proposal is clearly outside of the scope of current IOOS metadata resources. Tasks that might be addressed by NGDC during FY 2009 include:
Work with IOOS Data Providers to improve existing metadata for all products and services. The Metadata Standards Spectrum could be used to identify specific goals for each existing product.
Develop training materials based specifically on IOOS examples.
Register IOOS Services with GEOSS Registry and GCMD.
Develop approaches for integration of on-going quality monitoring results with standard metadata.
Develop approaches for encoding the IOOS Data Content Standards using National and International metadata standards.
Of course, these need to be discussed with the IOOS Program Office, lined up with existing resources and cast into a Statement of Work.

CoastWatch:

The CoastWatch team is actively improving their metadata through on-going partnerships with metadata experts at the NOAA Data Centers. The results of this partnership are clear in the next generation of the CoastWatch collection-level metadata presently available through CLASS. The Entities and Attributes sections of these metadata need to be incorporated into the CoastWatch Central metadata provision system to move the metadata to the "Complete FGDC" state on the MSS. Once that is done, we need to work towards including extended content in the CoastWatch metadata.

Tables 1 and 2 in Appendix 1 clearly indicate significant overlap between the CoastWatch granule metadata and the ISO 19115 and 19115-2 standards. The CoastWatch team should explore approaches that take advantage of this overlap as part of a comprehensive documentation system.

CO-OPS:

The CO-OPS/NGDC partnership has worked well for the one-minute water level data. The resulting high-quality metadata are ready to migrate towards ISO. That effort needs to be expanded to encompass other CO-OPS datasets.

CO-OPS is clearly a leader in providing access to data using web services. The area of standard service metadata (using ISO 19119) is closely related to dataset metadata (ISO 19115). This is an area in which CO-OPS could clearly provide good leadership.

NDBC:

NDBC provides data and metadata in several standard formats (WMO Pub47 and F291). These formats are widely used and contain a significant amount of useful metadata. Developing a mechanism for making that information available in standard ways could be very useful.

In addition, NDBC could benefit from working with metadata experts to migrate their station metadata towards standard representations. Specifically, the information on the measurement and units page (http://www.ndbc.noaa.gov/rsa.shtml) sould be combined with information from a station inventory page (like http://www.ndbc.noaa.gov/data_availability/data_avail.php?station=41017) to create excellent FGDC-compliant entity and attribute section and quality sections for each station.

Metadata Working Group

The NOAA IOOS Metadata Working Group (NIMWG) includes experts from several NOAA Line Offices. They held bi-weekly telecons to discuss IOOS metadata requirements.

How does your project/working group compliment or link with DIF activities?
Data integration efforts like IOOS face many technical barriers. Once those barriers are overcome, the real work – understanding the integrated picture – begins. That can not be done without understanding the data. That requires readily available and understandable documentation - metadata.

What is the current status? Provide brief update.
This working group formulated some recommendations to be presented to the IOOS Program at this meeting.

Milestones and Challenges

Success stories, project accomplishments, benefits.
The group used the GEO-IDE Wiki as a home base and a significant amount of material was added to that wiki by Ted (metadata) and Alex (DMAC Data Management Guide). We also came to understand how some simple capabilities that are build into the wiki (categories) could be helpful in arranging content and making it more findable.

In the time since this group started – the North American Profile of the ISO Metadata Standard has been approved and general consensus is forming across NOAA that the ISO metadata standards are the target at this time.

What have been the challenges (technical or strategic) to this project/working group? How were challenges resolved?
Engaging a volunteer community is difficult in a situation where everyone is already overwhelmed with their own tasks. This challenge has yet to be resolved.

Wiki: http://www.nosc.noaa.gov/dmc/swg/wiki IOOS Metadata Working Group

Next Steps/ Recommendations

What is the next phase of your project/working group?
We are using the best tools for collecting community input and guidance. We need to expand the contributing portion of the IOOS community.

Provide recommendations for going forward
We have recommendations in three areas: Standards, Tools, and Terminology and questions about a registry.

Metadata Recommendations: Standards

The Program needs to identify and document metadata content that is required to support all data related capabilities and services.

Guidance for representing that content needs to be provided for the ISO 191*, FGDC with appropriate extensions, and Directory Interchange Format (DIF) metadata standards, in that order of priority.

Content already identified as important includes: file formats and structures, data attribute details, data transformations, quality control procedures, quality flags (with definitions), and data error characteristics.

Metadata Recommendations: Tools

The Program needs to identify and help document metadata tools that are 1) being used by IOOS Data Providers and 2) other groups or programs to create and maintain standard metadata. This guidance should be focused and integrated with the service and capability descriptions described above.

The Program should identify, document, and help test tools and stylesheets (XSLTs) for translating existing metadata into the ISO 191* standards and for translating metadata content from the ISO Standards into other standards. If tools supporting specific translations can not be identified, the Program should consider leading the development of those tools.

Metadata Recommendations: Terminology

The Program should evaluate existing vocabularies related to ocean observations and identify a small number (2-3) to focus adaptation or development efforts on.

The Program should work with the Marine Metadata Initiative to engage the broader IOOS community in this process.

The Program should focus on vocabularies related to ocean observations rather than data taxonomies or other higher-level items.

Metadata Recommendations: Registry

What would this registry contain (metadata, URNs)?

What is the scope of the registry? It would clearly include metadata for environmental datasets. Would it also include information about regulatory, administrative, legal enforcement, protected resources, habitat data?

What is the relationship between an IOOS registry and others? How can we use existing registries effectively?

How are the linkages between metadata in the registry and the data they describe tested and maintained?

Use Case to CRUD

Data Providers / Scientists | Metadata Standards Experts | Technologists

Metadata Content
Independent of standard

Standard Implementation / Guidance
ISO 191*
OGC Capabilities
FGDC W/ extensions
NASA DIF
Dublin Core

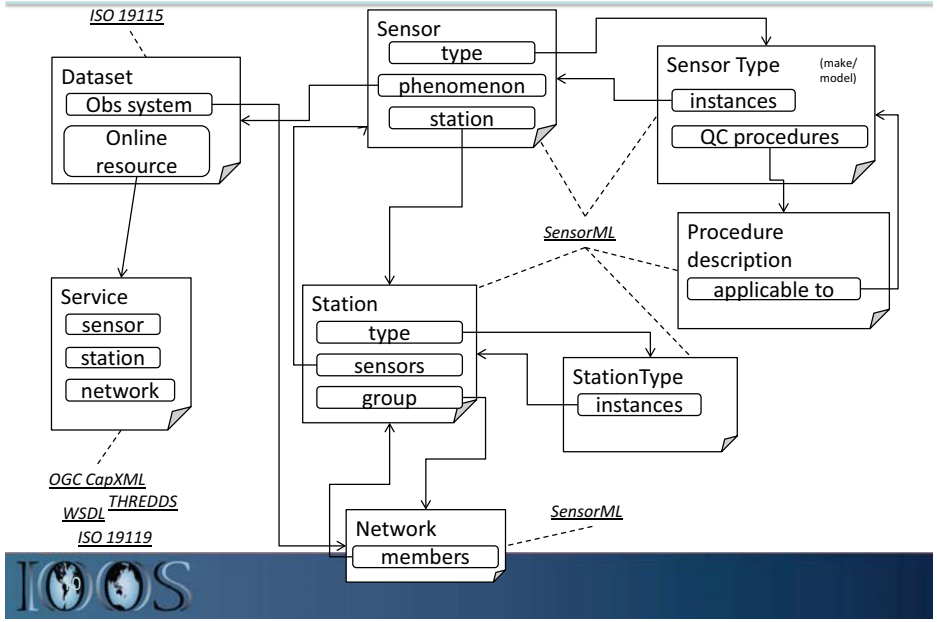
Presentation
Answers
XSLT, …

Scientific Question
Requirement
Use Case

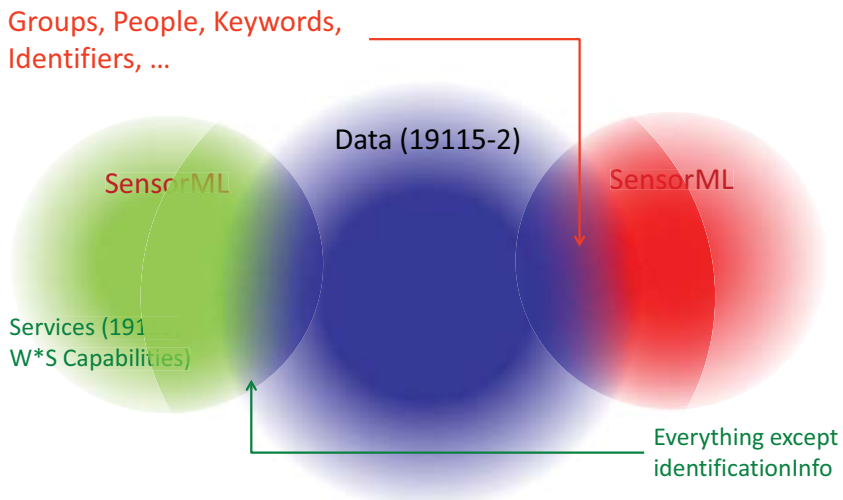
Metadata Management Interface (xForms, wiki)
Create / Read / Update / Delete

IOOS Metadata Linkage Model

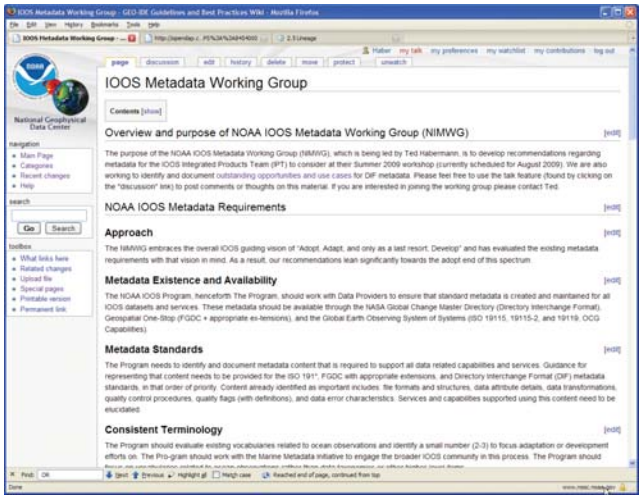
(Sensors, Stations, Networks, Datasets and Services)



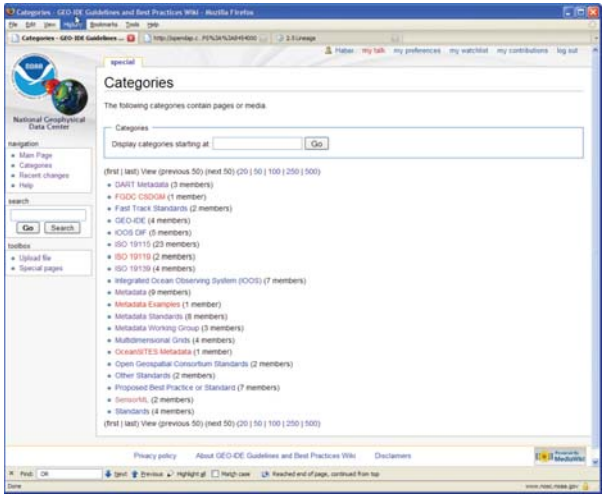
IOOS Metadata Linkage Model II



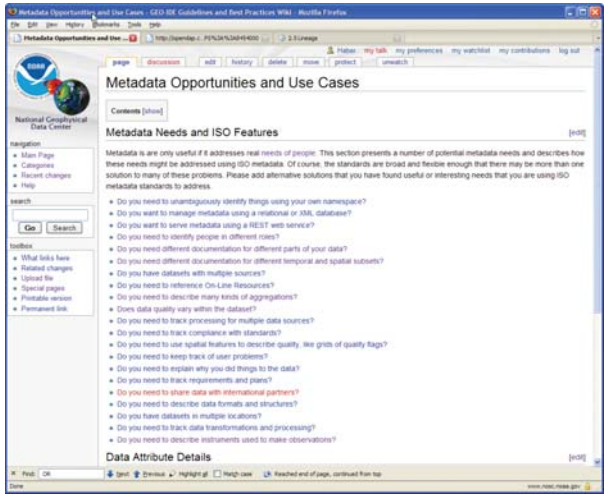
The Working Group Home Page



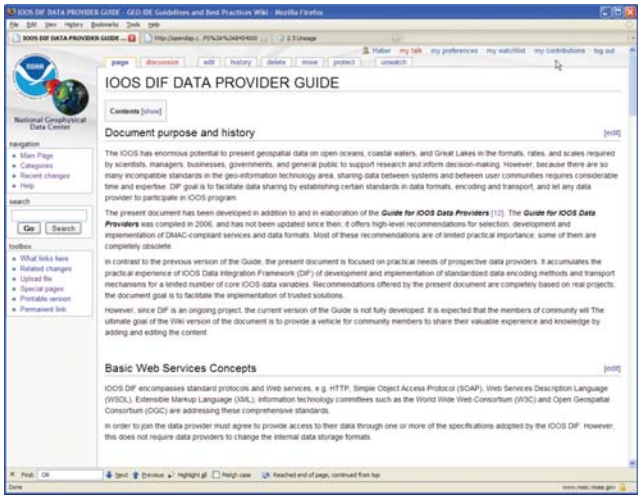
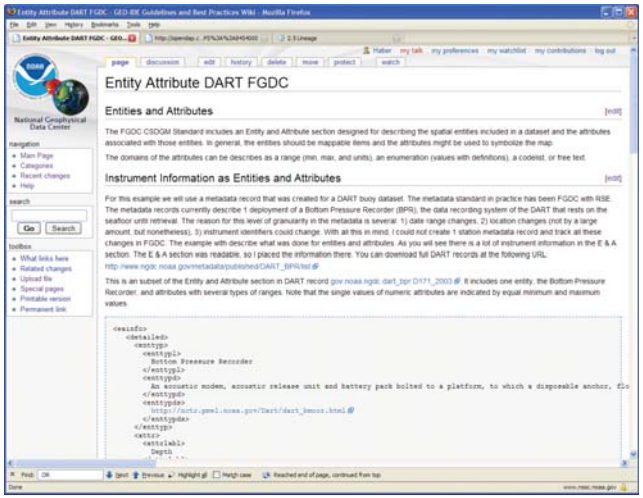
Categories Arrange Content



Opportunities and Use Cases



The Data Provider Guide



DART Instrument Descriptions